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Unveiling the Rich Indigenous Farming Practices: A Survey on the Awareness and Utilization Frequency of Indigenous Agricultural Implements and Knowledge among the Sumi Indigenous Youth of Nagaland

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Abstract
The indigenous tribes of Nagaland embody a distinctive culture and heritage from the rest of the country, which has been heavily influenced by agriculture, most popularly Jhum agriculture system. Jhum cultivation, an age-old traditional technique of cultivation driven by indigenous knowledge and customs, is the most prevalent form of agriculture in this region. The rough terrain and geographical isolation in this part of the country contribute significantly to the un-favourability and non-adaptability of modern agricultural mechanisms. In such a setting, tribal farmers rely heavily on indigenous wisdom that has been passed down from generation to generation. Unfortunately, the survival of this wisdoms and traditions is jeopardized as they are unwritten and transmitted down from generation to generation through word of mouth.Furthermore, there has been a decline in the engagement of the new generation in agriculture throughout the years, resulting in a significant drop in the number of practitioners. As a result, as knowledge struggles to remain in practise, and subsequently with the goal of examining the young generation's exposure to knowledge and practises, the researcher,recorded twenty indigenous agricultural implements and six indigenous agricultural practises obtained from the key informants and presented to the young respondents via an onlinesurvey, the result of which has been analysed using descriptive statistical tools.

Keywords: *Indigenous Agricultural Implements, Sumi-Naga, Indigenous community, Jhum cultivation, Nagaland*

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I. Introduction

India has been a treasure trove of biological wealth, intellectual knowledge, and spiritual insight for millennia(Sundaramari and Ranganathan 2013). The world has witnessed India's wonderful contribution to scientific knowledge, from the development of 'zero' to the establishment of a traditional medical system in the shape of 'Siddha' and 'Ayurveda.' Indian communities then became self-sufficient, self-sustaining, and self-reliant units as a result of the acceptance and execution of diverse traditional agricultural knowledge and practises. However, shortly after independence, India experienced a food supply shortage during the 1950s and 1960s for a variety of reasons. During that period, the Green Revolution came to the rescue, achieving sufficiency in food production through the introduction of high yielding cultivars, fertilisers, pesticides, modern implements, and so on. These reforms were costly and hence, concentrated only to few large scale farmers. As a result the small and medium farmers did not reap the benefit. Moreover, since the so-called 'technical packages' from the Western counties were brought in without much consideration of their suitability to Indian conditions and its implications. The Green Revolution did resulted in a significant boost in agricultural productivity, but unfortunately it also caused irreversible damage to the farming system. The lands were stripped of their natural nutrients, and there was rapid erosion of agricultural and livestock diversity, soil erosion, and salinization, all of which resulted in a greater need for expensive fertilisers and pesticides, exacerbating environmental imbalance while draining farmers' purses. All of this and more has forced a group of agricultural experts and policymakers

to see the dangers of continuing with these damaging contemporary agriculture systems and to seek a sustainable alternative.Among other proposed alternatives, was the 'traditional method,' which is low cost, organic, and eco-friendly in nature, having a solid ground in assuring agricultural sustainability in a developing country like India, with a high concentration of small scale farmers.

Indigenous methods are nothing but indigenous knowledge established and used by the forefathers and carried on by farmers, particularly in rural areas.The World Intellectual Property Organization(WIPO) refers to Indigenous Knowledge (IK) as Traditional Knowledge (TK) and 'encompasses the content or substance of traditional know-how, innovations, information, practices, skills, and learning of TK system such as traditional agriculture, environmental or medicinal knowledge.'According to Greiner(1998), indigenous knowledge is the unique, traditional, local knowledge that exists within and is created around the specific conditions of indigenous women and men in a given geographic area. Thus, IK can be defined as the knowledge or information that people in a community have gained and continue to grow over time based on experience and adaptability to local conditions. This information can also be viewed as the foundation for local-level decision-making in agriculture, healthcare, food preparation, education, natural resource management, and a variety of other activities. The practises that emerge as a result of such knowledge are referred to as indigenous practises.

Indigenous agriculture methods relate to the agricultural system guided by indigenous knowledge nurtured by the region's indigenous people. Farmers' agricultural practises that have evolved locally and have been passed down through generations are referred to as indigenous practises(Talwar and Singh 1993). Indigenous knowledge is also defined as the sum of the information and abilities that people in a specific geographic location have that enable them to make the most of their natural surroundings(Marrewijk 1998). This knowledge and skill set has primarily been passed down from generation to generation, with regular adaptations made to adapt to changing circumstances and environmental conditions. Indigenous agriculture practises are low-cost, time-tested, and environmentally beneficial, and they help to sustain agricultural development (Kanagasabapathi 1996).Adopting indigenous agricultural practises is now being seen as a potential path to long-term sustainability. Traditional resource management strategies used on small farms throughout the poor world can teach us a great deal(Biggs, Huntley, and Tinnermeir 1974). Many indigenous practises in agriculture and related industries, however, have been superseded by so-called contemporary technologies and have become obsolete, particularly among younger generations (Sundaramari and Ranganathan 2013).The decline in the prime working adult (20-59 years) over the last decade, according to estimates derived from unit-level data from the Employment and Unemployment Survey (EUS) of 2004-05 and the Periodic Labour Force Survey (PLFS) for 2018-19 by the National Sample Survey Organization (NSSO), from 40 per cent in 2004-05 to 23.3 percent in 2018-19(Mahambare, Dhanaraj, and Sharma 2021), clearly indicates the decline of younger generation involvement in agriculture in India. In a scenario where indigenous knowledge is severely disadvantaged due to its unwritten nature and the entrance of westernisation, the data presented above predicts a bleak future for the survival and sustainability of the practises.

While many specialists believe that documenting traditional agricultural traditions is critical, it is equally critical to understand where the young generation, who are considered as future practitioners and preservers, stand on this. As a result, the current work seeks to examine the youth's awareness of indigenous agricultural practises, used by tribal farmers by analysing responses gathered through a set of carefully constructed survey questionnaires.

Background of the study area

The community under study is the Sumi Naga tribe of Nagaland, India. They are one of the state's major tribes, primarily dwelling in the districts of Zunheboto and Niuland, but also widely dispersed in the districts of Dimapur and Kohima. The Mongoloid race is represented by the people. Nagaland, with a total area of 16,579 square kilometres, is a mountainous state dominated by mountains. The climate of the state is primarily monsoon, with high humidity levels. Annual rainfall ranges from 1800 to 2500mm, with the majority falling between May and September. Agriculture employs more than half of the population. According to the United Nations, *jhum* cultivation is the most widespread form of agriculture in Nagaland, accounting for 76 percent of crop area (Nakro 2011). Agriculture in this region is primarily influenced by traditional techniques that have been passed down through centuries. Because there is no written record of the practises, they are communicated and passed on through word of mouth in the form of folktales, folksongs, beliefs, rituals, and so on. They take advantage of the resources that are accessible to them. Because Nagaland is rich in bamboo resources, the indigenous utility of bamboo can be seen throughout the region's livelihood activities, particularly agriculture. Paddy and maize are the two principal crops grown in Jhum fields, along with millet, ginger, eggplant, cucumber, pumpkin, pepper, spring onion, bean varieties such as soybean and kidney beans, and various sorts of vegetation.Cultivation is done primarily for personal consumption rather than for commercial interests.

Indigenous land use and management

Land utility and management, particularly agricultural operations, are eventually modified and arranged depending on their contact and experience with environment over time. The Naga tribe's life is inextricably linked to the land. Land is considered not merely a commodity or property, but also a component of their identity and a source of existence. Land is widely regarded as the most valuable economic asset and a source of social dignity. Due to its economic, political, and symbolic value, cultivable land is often regarded as the most precious form of property among the tribes. Land is not only regarded as a productive and significant source of living sustenance, but it also gives people with a feeling of identity and rootedness due to its durability and permanence, which no other asset possesses. The ownership of land and the individual right to use it has traditionally been governed by Customary Laws, which are protected under Article 271A of the Indian Constitution. Sumi, along with the Konyak and Chang tribes, have a completely distinct land ownership structure than the rest of the other Naga tribes. Among the Sumi tribes, land ownership is vested in the local chief (*Akukau*). Because the chief controls the land, he has complete authority and privilege. The chief determines how much land each household gets to farm based on the needs of the entire village community. Some land is privately held, however the percentage varies from town to village. Land has traditionally been regarded as the primary source of life for Sumi people. They regard land as much more than a mere utility, but as life itself. They consider land to be a wonderful gift from God and so sacrosanct. Traditionally, the Sumi, like the rest of the Naga tribe, use the land for three main purposes: settlement, agriculture, and forest conservation. Above all, the Sumi tribe is reliant on agriculture for survival.

II. Methods And Materials

To achieve the study's goal, the researcher used an Exploratory Research Design. The Survey technique and Focused Group Discussion were employed as Primary Research Methods. First, a focus group discussion (FGD) with twelve elderly Sumi tribe members was held, during which Indigenous knowledge practises were recorded. Second, a survey method, specifically a Google survey, was developed and deployed to obtain the awareness of the youth. The survey questionnaire contained both open-ended and closed-ended questions. Secondary data was gathered using the Secondary Research Method, which included literature such as publications, textbooks, articles, magazines, and so on, as well as online sources such as websites, e-libraries, and so on. A total of 100 responses were collected, with 55 per centmale and 45 per centfemale taking part. The average age of the respondents is 27 years old. Thirteen percent of those polled were married, while 87 percent were single. In terms of employment status, 58 percent were found to be employed, while 42 percent were found to be unemployed, including students.The data have been analysed using descriptive statistics analysis, the measures of variance like minimum, maximum, range, mean, standard deviation and rank were applied to ascertain the opinion of the respondents' awareness and utility of indigenous agricultural practices.

III. Result

a. Indigenous agriculture system of the Sumi tribe

Sumi's original method of growing is pure and basic *Jhum* cultivation. *Jhum* fields are valued possessions of the region's indigenous people. It is deeply ingrained in the people's culture and customs. *Jhum* cultivation follows a set procedure. In a *Jhum* cultivation system, the fields are cultivated for two years in a row, sometimes one year depending on certain factors, after which the plot is left fallow for a minimum of five to six years and a maximum of twenty to twenty-five years, with the average fellow period remaining at seven to eight years. This permits the land to regenerate and resume its route to recovery.The *Jhum* process begins with the felling of trees and bushes, which are subsequently burned. The *Jhum* field is burned while carefully monitoring the wind direction to avoid accidents and casualties. Insects, bugs, and fungi present in the field are eliminated by burning. It also slows the growth of weeds by damaging their roots and tubers, which causes them to go dormant for a season or two. The ash from the burning is mixed with the soil, and the alkali content of the ash neutralises the acidic soil created under the forest in the heavy rainfall belt. The half-burned tree trunk is cut down and utilised as a contour bund on slopes to minimise soil erosion caused by runoff water during rainfall. The division of labour in Jhum agriculture is well delineated by gender roles. Male workers are generally assigned relatively heavy tasks such as clearing the jungle with a *dao* locally known as *azuta*, cutting down trees with an *amughu* (axe), burning *Jhum* fields, clearing away left out logs, constructing footpaths, bridges, and field huts, whereas women perform operations such as sowing and weeding using implements such as *hangokuphu* (hoe), *akua* (hand scrapper), *akwo* (rake), etc. Males and females work together to prepare the land, usually using *akuphu* (spade), *azuta*, and *akwo* (rake). Harvesting and carrying crops is a task undertaken by both parties. Guarding crops against predators falls within the male domain. *Jhum* cultivation allows the farmers to grow varieties of crops for different seasons which are most suited to the community. It allows them to grow varieties of crops depending on the choice of crops suitable for the cultivable lands. Rice is the main cultivated and consumed crop in the region.

Corn, millet, cotton, bean variations, pumpkin, cucumber, ladies finger, chilies, onion, potato, brinjal, soya bean, green leaves, oilseeds such as sesame and perilla seeds, and other crops are produced in the *Jhum* field. In a Jhum field, farmers typically practise mixed cropping, growing legume crops alongside cereals since cereals grow better in combination with legumes due to a symbiotic interaction in which microorganisms fix nitrogen in legume root nodules, making it available for uptake by cereals. Weeding is usually done at regular intervals with a hand scrapper known locally as *akwo*, largely by women.Weeds that have been cut down are either planted along the contour or used as mulch. Contour bunds are densely laid in between to avoid soil erosion caused by rainwater runoff. Contour bunds are built by putting and arranging logs, bamboo, and stones across slopes to prevent soil erosion. The barrier is supported by tree trunks and poles that remain standing after slashing and burning. To prevent soil erosion, leaves, weeds, twigs, straws, and barks are heaped along the barrier. In the *jhum* field, an Alder plant known locally as *Lutusu* is planted.Alder is a nitrogen-fixing plant that makes an excellent hedge plant. It not only improves soil structure with leaf litters and root nodules, but it also helps to prevent soil erosion since the roots hold the soil tight. A field hut, known locally as *Axapiki*, is built in the midst of the field and serves multiple functions, including sheltering farmers on rainy days and giving shade in the summer. In addition to serving as a resting place, it also serves as a temporary storage unit during harvest.Storing grains for consumption and seeds for the following year is done in a traditional manner by keeping them in a granary locally called as *Abih ale* woven delicately with a bamboo ensuring a free passage of air as it helps maintain the potency of the seeds for the next use. The crops and vegetables to be sown the following year are sorted and hung by a horizontal pole in the kitchen or any other room of the house to ensure their longevity. Bamboo woven baskets of various forms and sizes, such as *amto, akho, aghupu, ashoghi*, and others, are used for transportation and storage of lesser quantities of grains.

b. Indigenous Agricultural Implements

The survey comprised a total of 20 traditional agricultural implements, which were categorised and briefly described based on their use during *jhum* cultivation. These instruments are all produced from eco-friendly natural materials, namely bamboo and wood. The Sumi tribe developed and used the indigenous agricultural implements, some of which are listed below.

i. **Land preparation operation**: These implements are used to prepare land for *jhum* cultivation, such as cleaning the footpath, clearing the forest, cutting down trees, digging the earth, breaking the clod, building contour bunds, and building fences, among other things. Male farmers are primarily responsible for these procedures. These are *Azuta* (machete), *Akuphu* (spade), *Athihesu* (mallet), *Akuwo* (rake) and *Ayikhumu*(jumper).

ii. **Sowing operation:***Hangokuphu is* used to prepare the soil for sowing by digging small holes in the seedbed, whereas *asuphe* is used to store the seeds while they are being sown. Female farmers usually wear *asuphe* around their waists, packed with seeds.

iii. **Weeding:**During weeding operations, these instruments are used to scrape weeds and undesirable debris from the field.

iv. **Scare crow:***Heruvu*and *Qhoqhopu*are an implement that serves to scare away predators generally made of bamboo and rope.

v. **Harvest operation:**Harvesting is done primarily with bare hands, but *ayevu* (sickle)is also used at times. After the grains have been harvested, *Athihesu* (mallet)is used to thrash them.

vi. **Storage Operation:** These bamboo and cane tools are used to store and transport harvested grains. The shape and size of these implements vary depending on their use and demand. These implements are-*Atughuko* (wine storage basket), *Amto* (bamboo basket), *Akho* (bamboo basket), *Ashoghi* (open bamboo basket), *Aqhupu* (closed bamboo basket), *Atsutoti* (tiny bamboo basket) and *Abih* (large grain storage basket).

vii. **Drying and cleanings operation:** These tools are used in a variety of food processing operations, such as drying, winnowing, cleaning, sifting, grinding, and milling. All of these operations are mostly carried out by women, with occasional assistance from men. These are *Athigha* (winnower), *Akhoje* (sieve), *Ayephu*(bamboo mat), *Akhumungoaboshu* (pastel and mortar).

c. Awareness and utilization of Indigenous Agricultural Implements

Thetable below presents the descriptive statistical analysis of awareness and utility of identified Indigenous Agricultural Implement by the respondents as recorded in the study. The responses of the awareness are presented in a tabular form. The responses were scaled from 1 to 5, 5 indicating highest utilization and 1 indicating the lowest. Hence, the measures of variance like minimum, maximum, range, mean, standard deviation and rank are applied to ascertain the opinion of the respondents' awareness and utility of indigenous agricultural implements.

Table 1: Descriptive analysis of awareness and utility of Indigenous Agricultural Implements

	Range	Minimum	Maximum	Utility frequency (Mean)	Awareness (Percent)	Std. Deviation	Rank
Azuta	4	1	5	3.67	100	.792	1
Akuphu	3	1	4	3.31	100	.692	2
Amughu	3	1	4	3.09	82	.712	3
Amuto	3	1	4	2.75	76	.770	4
Akho	3	1	4	2.55	75	.730	5
Ashoghi	3	1	4	3.12	74	.868	6
Aqhupu	3	1	4	2.92	67	.884	7
Athigha	3	1	4	2.40	64	.778	8
AyevuHashiwo	3	1	4	2.63	61	.861	9
Ayikhumu	2	1	3	2.46	60	.717	10
AkhumungoAboshu	2	1	3	2.22	59	.733	11
Akhoje	3	1	4	2.61	58	.764	12
Ayephu	2	1	3	2.27	55	.584	13
Akuwo	3	1	4	2.64	52	1.000	14
Atsutoti	3	1	4	2.18	48	.757	15
Hangokuphu	3	1	4	2.50	42	.823	16
Akua	3	1	4	2.78	41	.836	17
Athihesu	3	1	4	2.45	37	.903	18
Asuphe	3	1	4	2.12	22	.913	19
Atughuko	2	1	3	1.89	18	.634	20
Mean Score	3	1	4	2.63	59	.788	

Source: Survey 2021

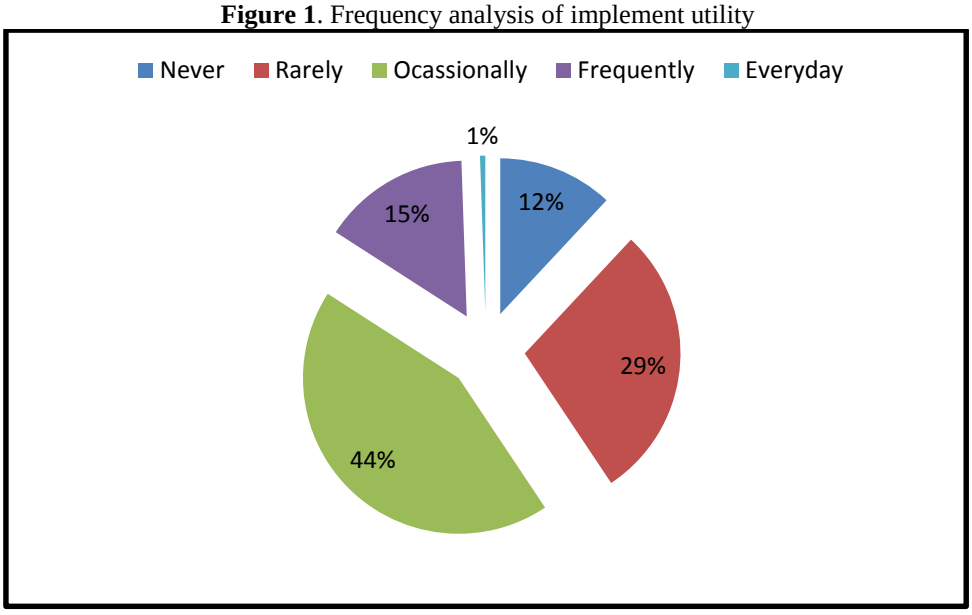
Table 1 presents the descriptive statistics of the awareness among the respondents about the implements employed by Sumi farmers during *jhum* cultivation farming operations. From the table it is clear the implement with the highest awareness score is *azuta* which was found to be known to all the respondent with an awareness percentage of 100 per cent at a mean value of $\overline{x} = 3.67$, followed by *apukhu* with 100 percent as well ranking second at a mean score of $\overline{x} = 3.31$. It is no surprise that both were found to be well known to all the respondents because these are the two most popular implements and the two most commonly used by all irrespective of whether the household is engaged in the agricultural operation or not. Amughu which is an implement used for cutting trees and chopping wood logs was found to be known to 82 per cent of the respondent ranking third with a mean value of $\overline{x} = 3.09$. Ranking fourth is *amuto,* the implements which were found to be known to the majority of the respondents at 76 percent with a mean value of$\overline{x} = 2.75$, it is a loosely woven bamboo baskets used to carry and store grains or carry firewood or water from the stream, it may be found in different shapes and sizes. *Akho* ranked fifth with 75 per cent awareness quotient at $\overline{x} = 3.12$ is a tightly woven bamboo carriage basket used to transport food grains or other items from one place to another. Ashoghi ranked sixth with 74 per cent and a mean score of$\overline{x} = 3.12$,*ashoghi* is a tightly woven open bamboo basket with a wide mouth used to store grains of lesser quantity. Ranking seventh is the *aqhupu* at 74 percent at $\overline{x} = 2.92$,*aqhupu* is a tightly woven closed bamboo basket used to store crop items (especially *axone*[1]) or even meat which may be found usually placed above the fireplace. Further an implement used after harvest and during food processing operation namely *athigha*- used as a winnower was found to be known to 64 per cent ranking eighth at$\overline{x} = 2.40$. *Ayevu*, an implement used during harvest was found to be known to 61 per cent

[1]Axone is a popular Sumi cuisine made of fermented soyabean.

ranking ninth at a mean value of $\bar{x} = 2.63$.The implement used for digging the earth during the construction of field hut or granary known as *ayikhumu* is a cylindrical iron implement that was found to be known to 60 percent of the respondent ranking tenth at $\bar{x} = 2.46$. A set of wooden object known as *akhumu* and *aboshu* used for pounding and milling purpose was found to be known to more than half of the respondent at 60 percent with a mean score of $\bar{x} = 2.22$. Ranking twelfth is*Akhoje*, an implement used to sieve out unwanted particles from the grains, which was found to be known to 58 per cent with a mean value of $\bar{x} = 2.61$. While *ayephu* a rectangular bamboo or cane mat used for sun-drying the food grains was also found to be known to majority i.e, 55 respondents with a mean score of $\bar{x} = 2.27$.The implement used during land preparation operation or more specifically for gathering cut down bushes and leaves known as *akwo* was found to be known to 52 percent of the respondents ranking fourteenth with a mean score $\bar{x} = 2.64$.*Atsutoti* is a tiny bamboo basket used as a shoving object while transferring grains from one basket to another, it is also used to store small objects or used to park the rolled thread while weaving. It was found to be known to 48 per cent of the respondent with an adoption mean score of $\bar{x} = 2.18$. This is followed by *hangokuphu*, an implement used during land preparation operation as well as seed sowing operation, it found to be known to 42 percent at $\bar{x} = 2.50$. Furtherore, the implement used during weeding operation known as *akua* which is basically a hand scrapper was found to be known to 41 percent of the respondent with a mean value of $\bar{x} = 2.78$.Another implement used for breaking the clod during land preparation as well as for thrashing the grain after harvest, known locally as *athihesu* was found to be known only to 37 percent of the respondents at $\bar{x} = 2.45$. The implement least known to the respondents were *atughuko* and *asuphe*with an awareness score of18 percent at $\bar{x} = 2.12$and 22 percent at $\bar{x} = 1.89$, respectively. The former is a wine storage basket and the latter is a small bamboo basket with lace worn around the waist by a female farmer while sowing the crop seeds. The awareness of these two implement was seen to be known to very few respondents because of these simple facts: with regard to *atughuko*, the winemaking in the Sumi household is not as common phenomenon as it used to be anymore, also due to the availability of modern containers in the market the implement in question has lost its place in many of the Sumi households, and with regard to *asuphe*, the declining rate of people's involvement in agriculture is one and availability of alternative in the market is the other reason for such low awareness.

Out of 20 indigenous agriculture implements, 14 implements were found to be aware to more than half of the respondents whereas only six implements were found to be known to less than half of the respondents. The percentage score varied as high as 100 percent and as low as 18 percent, with an overall percentage average of 59 per cent at an overall mean score of 2.63 with a standard deviation of 0.788 and a range of 3.

Figure 1. Frequency analysis of implement utility



The figure above presents the frequency analysis of overall implement utility by the respondents. It is seen from the figure that only one per cent of the respondent uses the average number of implements everyday while 15 per cent uses it frequently, followed by 43 per cent using them occasionally, 29 per cent using them rarely and 12 per cent of the respondent never using any of the implements before.

d. Indigenous agriculture knowledge

In their quest for survival, the tribal people observed, acquired, and experimented with many strategies to overcome the various obstacles they encountered along the way. These accumulated learnings culminated in the development of problem-solving solutions that future generations would embrace, employ, and modify. Over the years, the effective application of this knowledge and wisdom has helped to avoid many serious catastrophes and offer security on numerous occasions. Among the indigenous knowledge practices included in the study that have withstood the passage of time are:

i. Application of salt in the *jhum* field to help manage the weeds and create balance in the soil.

ii. Traditional rain summoning coupled with community fishing on the river using a local herb known locally as *Aichi*. The community gathers together once a year to beat the *Aichi* roots along the riverbed, which inebriate the fishes, ensuring a bountiful catch, and the operation is completed in unison by all the members following the ceremonies, propitiating God for good rainfall for the crops to grow healthily.

iii. Because bamboo is widely employed in the manufacture of several implements, therefore ensuring its durability is a concern well looked after by the tribal farmers. To make these implements sturdy and durable, they use the smoking procedure, which kills any pests or insects that are already there and prevents them from invading in the future.

iv. The space above the fireplace has several functions, one of which being seed storage for the following season. The light smoking of the seeds provides an unfavourable environment for the bug to thrive in.

v. The Alder tree is planted in the *Jhum* field for a number of reasons. One of its applications is to improve soil quality. Alder is a nitrogen-fixing plant that helps to create a conducive environment for plant growth.

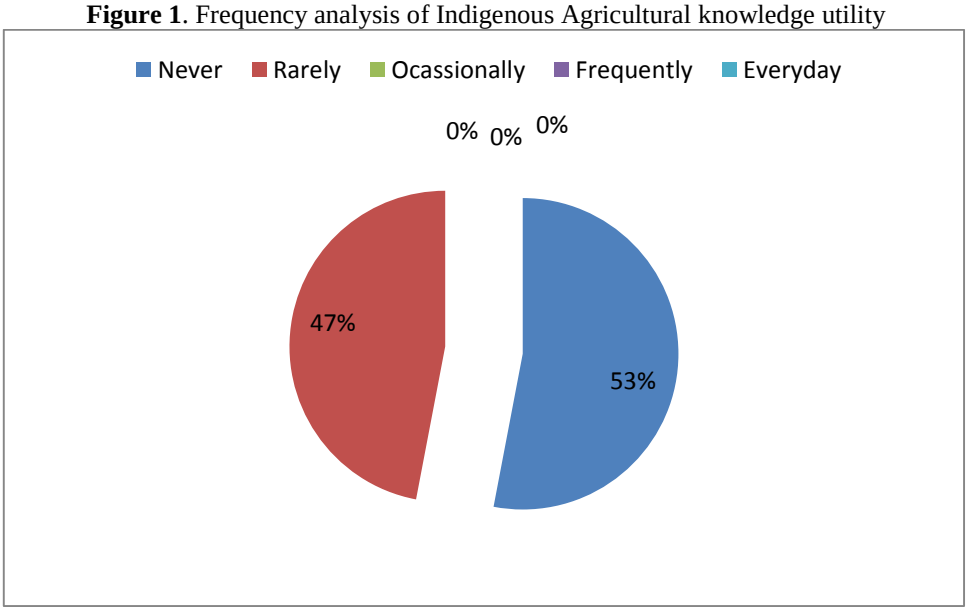
vi. The Alder plant can also be used to prevent soil erosion. Because the *jhum*field is prone to severe soil erosion, controlling soil erosion becomes an important concern. This is where the Alder tree comes to the rescue, as its roots help keep the soil tight, preventing soil erosion.

Table 2: Descriptive analysis of awareness and utility of Indigenous Agricultural Knowledge

	Awareness(in per cent)	Range	Minimum	Maximum	Mean	Std. Deviation	Rank
Aichi	51	1	1	2	1.49	0.502	1
Seedsmoking	48	1	1	2	1.44	0.499	2
Salt	39	1	1	2	1.51	0.502	3
Bamboosmoking	36	1	1	2	1.5	0.503	4
AlderSoilFertility	36	1	1	2	1.4	0.492	4
AlderSoilErossion	34	1	1	2	1.46	0.501	5
Mean Score	40.66	1	1	2	1.46	0.499	

Source: Survey 2021

Figure 1. Frequency analysis of Indigenous Agricultural knowledge utility



The above table shows the descriptive statistical analysis of awareness and utility of the indigenous agricultural knowledge by the respondents. Here utility refers to the adoption of the practices by the respondents. It is clear from the data that the practice of *Aichi* ranked the first in awareness with 51 per cent with low utility, followed by smoking of seed for protection and preservation at 48 per cent with low utility as well. The practice that ranked third is Salt usage for weed management which was found to be known to 39 per cent. The practice of smoking of bamboo implements for increasing its durability and the usage of alder tree for enhancing soil fertility was found to be known to 36 per cent of the respondent. Lastly the usage of alder tree for combating soil erosion was found to be known to 34 per cent of the respondent. The overall mean score of awareness of the practice is 41 per cent with an average adoption mean of$\overline{x} = 1.5$, i.e low with a standard division of 0.499.

Major findings

Following are the major findings of the study drawn from the analysis above.

i) The data reveals that out of 20 listed implements, 14 implements namely- *azuta, akuphu, amughu, amto, akho, ashoghi, aqhupu, athigha, ayevu, ayikhumu, akhumungoaboshu, akhoje, ayephu* and *akuwo* were found to be known to majority of the respondent whereas, six implements namely- *atsutoti, hangokuphu, akua, athihesu, asuphe* and *atughuko* were found unknown to majority of the respondents.

ii) The overall awareness percentage was found to be at 59 per cent, which means that more than half of the implements were found to be known to majority of the respondents.

iii) Regarding the frequency of utilization of the implements, it was found that only *azuta*, an implement which is used by both male and female from farming to domestic operation was found to be used on an everyday basis by 11 per cent of the respondent while none of the other implements were found to be used on a daily basis by the respondent bringing the average everyday utility to only one percent.

iii) From the data it is also revealed that the implement with the highest percentage of respondent revealing that they have never used this particular implement is *atughuko* with 85 per cent.

iv)Hence, the most popular and the most commonly used implement was revealed to *azuta* followed by *akuphu* and *amuto* and the least popular and least used implement was found to be *atughuko* and *asuphe*.

v) Further, regarding the awareness of the practices, the overall awareness quotient was found to be 41 per cent and adoption low with a mean score of 1.4 and a standard deviation of 0.499, hence showing overall moderate awareness and a low adoption.

IV. Conclusion

Various attitudes of the respondents were detected during the exchanges. Some of the respondent had in-depth understanding of the techniques and were even practitioners at one point. Some responders lamented their lack of knowledge. The agricultural system in this region has not changed much over the years, and therefore most of the implements are still at its original state without much alteration. The responses reveal that though the awareness of the implements is found favourable at an average of 59 per cent however its utility is quite low with majority of the respondent responding that they occasionally use most of the implements. The

reasons being, firstly, the implements are no longer accessible to them as there are no or very few countable artisans left in the villages who carve these implements, secondly, they voluntarily discontinued the application of these implements as they consider them to be obsolete,and lastly many of the respondents were revealed to have moved away from agricultural activities.The present study therefore gives the readers an idea of where the youth belonging to the Sumi indigenous community stand in their knowledge of the indigenous agricultural knowledge and practices. However the current study do not claim to present all of the Sumi tribe's indigenous agricultural practises, nor does it necessarily claim to reveal the youths' holistic view; however, it presents the youths' awareness and exposure to the listed implementsand practices in the study area, providing an understanding of where they stand and, hopefully, opening up space for further investigation.

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